Catalpa longissima (Jacq.) Dum. Cours. Yokewood

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Bignoniaceae Bignonia family

John K. Francis

Catalpa longissima (Jacq.) Dum. Cours., commonly known as yokewood (Jamaica), chenn (Haiti), and roble de olor (Dominican Republic) (*12, 14*), is a large tree (fig. 1) of the foothills and coastal plains. The species is planted in the region for ornament, shade, and timber. Yokewood produces a valuable wood that, for the current lack of extensive mature stands, is only available in small quantities.

HABITAT

Native Range

Yokewood is native to the islands of Hispañola and Jamaica (*1, 15*), which lie between latitudes 17.5° and 20° N. (fig. 2). The species also grows in Martinique, Guadeloupe, and the Grenadines (*10, 12, 20*); whether or not it is native to these three locations is not clear. Yokewood is planted throughout the West Indies, in Florida, and in Hawaii for forestry and ornamental purposes (*2, 13, 15*).

Climate

Yokewood is a very hardy species. In Hispanola, it grows in areas where mean annual precipitation (MAP) varies from 500 to 2000 mm (*24*). Trees planted in Puerto Rico have thrived in areas receiving up to 2500 mm MAP. The species can also withstand 2 or 3 months of no rain.[1] Although yokewood grows slowly on dry upland sites (*9*), plantations have been established with considerable success in areas receiving less than 1000 mm MAP (*23*). Mean January temperatures in native areas range from 22.5 to 25.0 °C, and mean July temperatures range from 27 to 30 °C (*19*). Frosts do not occur in the natural range.

Soils and Topography

The best stands and most vigorous reproduction of yokewood are found on sandy and gravelly river floodplains in dry areas (*23*). Yokewood tolerates seasonal flooding. Deep, calcareous sandy soils are probably best, although the species tolerates clay soils, rocky areas, and eroded fields—all but the harshest of sites (*11, 18, 20*). In Jamaica, stands of yokewood are associated with gravelly soils (*1*), most commonly near the coast (*22*). Whereas low elevation sites are most favorable, the species grows well at elevations of up to 1,000 m. Both hill and level areas are colonized (*12*).

Associated Forest Cover

The subtropical moist forest of the Dominican Republic survives only as scattered remnants, mostly on steep and remote terrain. Dominant associated species are *Swietenia mahagoni* Jacq. and *Cedrela odorata* L., with scattered individuals of *Petitia domingensis* Jacq., *Catalpa longissima,* and *Juglans jamaicensis* C. DC. (*24*).

Figure 1.—*Large yokewood* (Catalpa longissima) *tree growing in Haiti.*

[1] Jenkins, Michael B. 1988. The useful trees of Haiti: a selected review. New Haven, CN. 238 p. Draft manuscript on file at the Institute of Tropical Forestry, Río Piedras, Puerto Rico.

John K. Francis is a research forester at the Institute of Tropical Forestry, Southern Forest Experiment Station, USDA Forest Service, Río Piedras, Puerto Rico, in cooperation with the University of Puerto Rico, Río Piedras, Puerto Rico 00928.

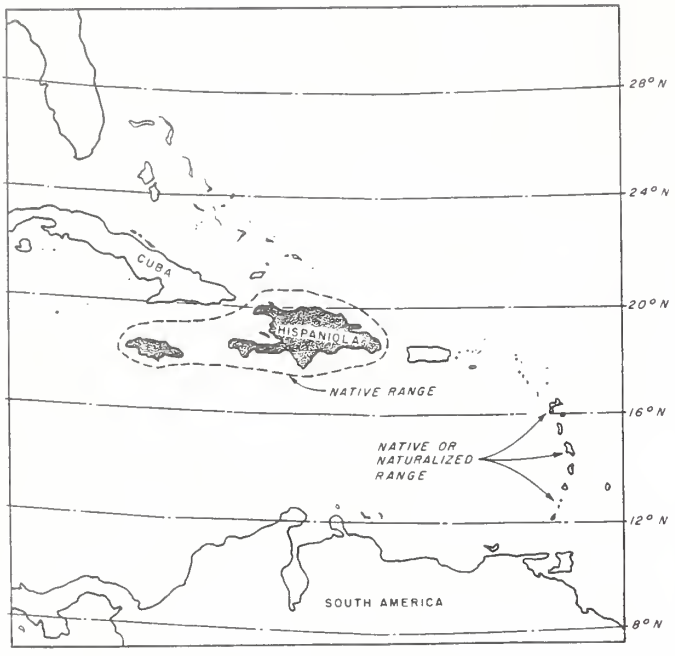

Figure 2.—*Geographic distribution of yokewood* (Catalpa longissima) *in the West Indies.*

dried, seeds are separated and stored in sealed containers in a refrigerator until they are planted (*9*). Seeds can be stored for 2 months at room temperature and for 1 year refrigerated in sealed plastic bags.[1]

Seedling Development.—Yokewood is easily propagated from seeds. The seeds may be germinated by thinly spreading them on a shaded bed of moist, sterile soil or sand and dusting over lightly with sand (*15*).[1] Alternately, they may be sown directly into nursery bags (five to seven per bag).[2] No pregermination seed treatment is necessary. Germination, which is epigeous, begins in about 10 days. In one test in Puerto Rico, 40-percent germination was obtained (author, personal observation). However, germination is highly variable between seedlots.[2] After 2 to 3 weeks, when the seedlings are 2 to 3 cm high, they can be transplanted into nursery containers. A week or so later, seedlings should be exposed to full or nearly full sun. Seedlings are ready for outplanting 10 to 14 weeks after sowing.[1] Normally, plantations are established using seedlings grown in containers. Wildlings (naturally regenerated seedlings) planted as stumps (tops removed) have been used with success on poor sites (*23*). Direct seeding has also been reported as a planting method (*12*).

Vegetative Reproduction.—Untreated woody cuttings can be used to reproduce yokewood (*18*). So strong is the tendency to root that the butt ends of logs lying on the ground in moist sites produce masses of roots from the cambium (author, personal observation). Young trees coppice readily when cut; even mature trees coppice on moist sites.[2]

LIFE HISTORY

Reproduction and Early Growth

Flowering and Fruiting.—The flowers of yokewood are 25 to 30 mm wide, 30 to 34 mm long, and borne in terminal panicles (*12, 13*). They vary in color from white with pale pink on the lobes to solid rose.[2] The species flowers irregularly throughout the year. Flowers are insect pollinated. Seedlings often flower as early as 6 months of age and produce an abundance of seeds by 18 months.[2] Multiple seed crops have been harvested from the same tree in 1 year. One fruit is formed per flower cluster (*14*). The dark-brown fruits are 4 mm wide and 35 to 75 mm long. When mature and dry, they split open to release dozens of tiny (1- by 8-mm) seeds with a tuft of cottony fibers at each end. Large trees may have a hairy appearance from so many fruits and old pods hanging from their crowns.

Seed Production and Dissemination.—Vigorous trees produce great numbers of seeds that may be carried considerable distances by the wind.[1] One seedlot collected in Puerto Rico averaged 600,000 ± 18,000 seeds per kilogram (author, personal observation). Mature fruits can be clipped from lower branches of medium to small trees or collected from trees felled in logging operations. After pods are air-

Sapling and Pole Stage to Maturity

Growth and Yield.—Yokewood generally grows at a moderate rate. Controls and treated plots in a fertilization trial in Jamaica reached an average height of 1 m in 4 years (*7*). Yokewood reached average heights of 2.5 m in 2 years, 6 m in 7 years, and 7.5 m in 10 years in species trials in Haiti (*3, 6*). At another site in Haiti, yokewood seedlings averaged 2 m at 1 year.[2] Seedlings tend to be very bushy but eventually develop a leader and a bole with good form (*23*). Dominant and codominant stems in a plantation on clay soil in Puerto Rico, in an area receiving 2500 mm MAP, grew 14 m in height in 13 years.[3] The dominants and codominants in another Puerto Rican plantation on clay soil, in an area receiving about 1500 mm MAP, averaged 20 m in height and 21 cm in diameter at breast height (d.b.h.) after 37 years (author, personal observation). This stand produced an average of about 4.5 m^3/ha/yr during its lifetime. Prediction equations and tables using d.b.h. have been published for bolewood volume and green and dry total biomass of individual trees in Haiti (*8*). Yokewood trees 30 m in height and 1 m in d.b.h. have been reported in Guadaloupe and Jamaica (*10, 22*).

Rooting Habit.—Seedlings produce a strong taproot that is often branched and that soon develops many fibrous lateral roots. Older trees produce a small buttress; moderate fluting is noted in the first meter or more of some stems.

[2] Personal communication, Joel Timyan, Haiti Agroforestry Research Project, Berthé, Pétion-Ville, Haiti, on file with the Institute of Tropical Forestry, Río Piedras, Puerto Rico.

[3] Unpublished data, Institute of Tropical Forestry, Southern Forest Experiment Station. USDA Forest Service, Río Piedras, Puerto Rico.

Reaction to Competition.—Yokewood is intolerant of shade. Seedlings do not become established in dark understories, and suppressed trees die within a few years. A plantation in Puerto Rico averaged 21.2 m^2/ha of basal area, 16.0 m^2/ha of which was yokewood. The crown ratio (crown diameter/d.b.h.) of 25 trees in this Puerto Rican plantation, whose d.b.h. ranged from 12 to 37 cm, averaged 25.1 ± 1.1 cm (author, personal observation). The crown ratio of 31 trees selected for superior phenotypic qualities in Haiti, ranging from 22 to 67 cm in d.b.h., averaged 18.6 ± 1.8.[2] Projecting from the Puerto Rican value, a plantation of yokewood trees theoretically could still have 81 trees per hectare as they reach 50 cm d.b.h., which is a harvestable size, if the plantation were fully stocked and the crowns just touched each other.

In Haiti, yokewood in agroforestry settings is traditionally heavily pruned to allow more light and rainfall to penetrate to understory crops. The species tolerates pruning well.[2]

Damaging Agents.—Leaf spot fungi (*Alternaria* sp., *Botrytis* sp., and *Cercospora* sp.) and an anthracnose fungus (*Collectotrichum* sp.) were found associated with leaves of seedlings but did not cause severe damage (*17*). The only serious enemy of large trees noted in the literature is a caterpillar called choni, which is common in Haiti and can cause defoliation.[1] The wet-wood termites, *Nasutitermes* spp., consume dead branches and sometimes boles of standing dead and fallen trees in Puerto Rico. The dry-wood termite, *Cryptotermes brevis* (Walker), can damage structures and furniture made from the heartwood of yokewood (*26*). Another source lists the wood as insect resistant (*18*); however, this may only mean that the wood is resistant to attack by powder-post beetles (*Lyctus* spp.). The wood of yokewood is durable, especially in exposed, aboveground uses (*14, 18*).

SPECIAL USES

The heartwood of yokewood is light- to dark-grayish brown, pinkish brown, or light brown, which contrasts with the light-tan to grayish-tan sapwood (*13, 14*). This wood is generally straight grained, medium to course textured, and lustrous (*14*). The specific gravity of the air-dry wood varies from 0.60 to 0.80 g/cm^3 (*14*). It is medium hard and elastic. Yokewood is sawn (*23*) and planed easily.

Yokewood is used for furniture, banisters, interior and exterior trim, framing, sills, flooring, shingles, bridge timbers, posts, piling, stakes, and building boats and carts (*4, 14, 23, 25*). It was recommended for firewood in an agroforestry program in Central America (*16*). Branches and nonmerchantable trees are used for fuelwood and charcoal in Haiti. Green woody biomass has a moisture content of 50.5 percent (weight of water/weight of fresh sample) and a specific gravity of 0.55 g/cm^3 when ovendry (*8*).

Yokewood trees grow a sparse crown that allows plenty of light to filter into the understory. This trait makes it attractive as an agroforestry shade species.[1] The thin foliage, pale-green leaf color, and generally inconspicuous floral display detract somewhat from its appeal as an urban shade tree and ornamental (*5*). However, yokewood has been widely planted, especially along avenues and rural roads (*12*). The bark of yokewood is used in folk medicine as an astringent, to reduce fever, and to treat dysentery and hemorrhoids (*25*).

GENETICS

There are 10 species of *Catalpa* in North America, China, and the West Indies (*21*). Yokewood has been known by the botanic synonym *Macrocatalpa longissima* (Jacq.) Britton (*13*).

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